

 Saint Joseph School Cornet Chahwan Secondary School Division Name _____ Class/Section: 1S	Date	09 / 12 / 2019	 INTERNATIONAL SCHOOL AWARD 2017-2020
	Duration	50 minutes	
	Subject	Math / Absolute value – Powers and radicals – Addition of vectors	
	Exam	Test 2 / Term 1	
	Score	/20	

I. Choose the correct answer: *Justify your work*

(8 pts)

1. What is the value of n if $|n-1|+1=0$

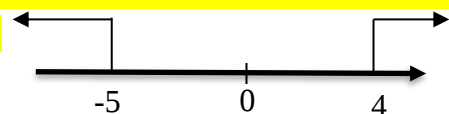
a. 0

b. 2

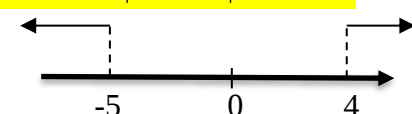
c. there is no value of n

2. Which of the following represents the solution of $|2x+1|-3 \geq 6$?

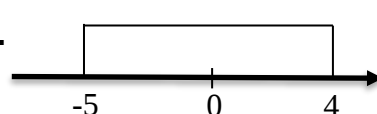
a.



b.



c.



3. $\sqrt[4]{(1-\sqrt{5})^4} - \sqrt[3]{(2-\sqrt{5})^3} =$

a. -3

b. $2\sqrt{5}-3$

c. $-2\sqrt{5}-1$

4. If $|x| \geq -5$, which of the following represent all the possible values of x ?

a. $x \geq 5$ or $x \leq -5$

b. $-5 \leq x \leq 5$

c. all real numbers

5. $[1,7[\cup]-1,7] =$

a. $[1,7[$

b. $] -1,7]$

c. $[-1,7]$

6. If $-16y = 2^{4+x}$ then $y =$

a. 2^x

b. -2^x

c. $-x$

7. If ABCD is a parallelogram of center O then $\overrightarrow{OA} + \overrightarrow{OB} + \overrightarrow{OC} + \overrightarrow{OD} =$

a. $\overrightarrow{CA} + \overrightarrow{CO}$

b. $\overrightarrow{AC} + \overrightarrow{BO}$

c. $\overrightarrow{AB} + \overrightarrow{CD}$

8. If $x \leq 2$, then $\sqrt{(2-x)^2} =$

a. $x-2$

b. $2-x$

c. 0

II. Solve the following:

(4 pts)

a. $-2x^3 + 2 = 56$

b. $2|3x + 2| - 3 < 7$

c. $(2x + 3)^4 = 16$

d. $7|x - 2| + 7 = -2|x - 2| + 25$

III. Let $A = (2x - 1) - |2x - 1| + 4$ and $B = \frac{x - 1}{|x| - 1}$

a. Express A without an absolute value. **(1 pt)**

b. Determine the interval of x where A independent of x. **(0.5 pt)**

c. Determine the domain of definition of B. **(1 pt)**

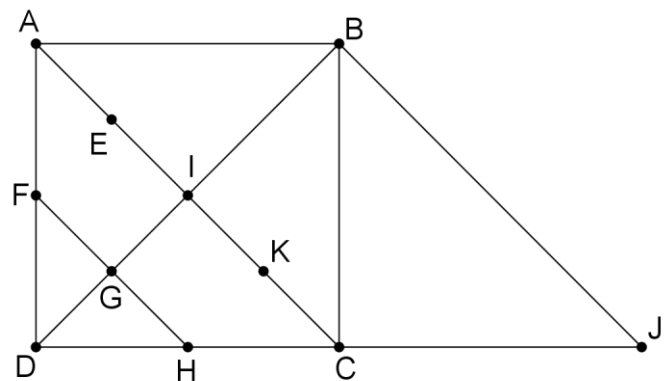
IV. Simplify the following: Express the final answer in the form of a radical when possible. (2.5 pts)

a. $\frac{(a^{2n})^{-2}}{\sqrt[3]{a^{2n}}} \div \frac{(a^{4n})^{\frac{1}{3}}}{(a^3)^{2n}}$

b. $\sqrt[15]{\frac{32^{3n} + 6^{15n}}{27^{5n} + 9^{15n}}}$

V. In the adjacent figure, Given:

- ABCD is a square of center I
- E, F, G, H and K are the midpoints of [AI], [AD], [FH], [DC] and [IC] respectively.
- J is the fourth vertex of parallelogram ABJC



Fill in the blanks: (On the official paper)

(3 pts)

a. $\overrightarrow{AB} + \overrightarrow{AD} = \overrightarrow{B...}$

b. $\overrightarrow{FI} = \overrightarrow{...K} = \overrightarrow{D...}$

c. $\overrightarrow{GK} + \overrightarrow{K...} = \overrightarrow{FE}$

d. $\overrightarrow{FG} = \frac{1}{2} \overrightarrow{...I}$

e. $\overrightarrow{IA} + \overrightarrow{I...} = \vec{0}$

f. $\overrightarrow{AB} - \overrightarrow{BC} = \overrightarrow{...}$

1) $|n-1|+1=0 \Rightarrow |n-1|=-1$ impossible (c)

2) $|2x+1|-3 \geq 6$

$|2x+1| \geq 9$

$\Rightarrow 2x+1 \geq 9$

$2x \geq 8$

$x \geq 4$

and $2x+1 \leq -9$

$2x \leq -10$

$x \leq -5$

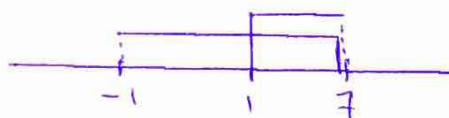
(a)

3) $\sqrt[4]{(1-\sqrt{5})^4} - \sqrt[3]{(2-\sqrt{5})^3} = |1-\sqrt{5}| - (2-\sqrt{5})$

$= \sqrt{5} - 1 - 2 + \sqrt{5} = 2\sqrt{5} - 3$ (b)

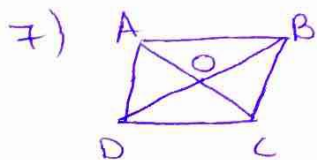
4) $|x| \geq -5$ (c)

5) $[1,7[\cup]-1,7] =]-1,7]$



(b)

6) $-16y = 2^{4+x} \Rightarrow y = \frac{2^{4+x}}{-16} = \frac{2^{4+x}}{-2^4} = -2^x$ (b)



$\vec{OA} + \vec{OB} + \vec{OC} + \vec{OD}$

$= \vec{OA} + \vec{OB} + \vec{AO} + \vec{BO} = \vec{0}$

$\vec{AB} + \vec{CD} = \vec{0}$

(c)

8) $\sqrt{(2-x)^2} = |2-x|$

$|2-x| = \frac{2}{2-x} \Leftrightarrow x=2$

(b)

(1)

II . a) $-2x^3 + 2 = 56$

$$-2x^3 = 54$$

$$x^3 = \frac{54}{-2} = -27 \Rightarrow x = \sqrt[3]{-27} = -3$$

b) $2|3x+2| - 3 < 7$

$$2|3x+2| < 10$$

$$|3x+2| < 5$$

$$3x+2 < 5$$

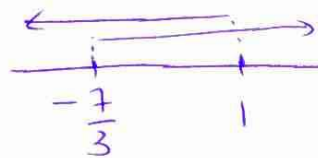
$$3x < 3$$

$$x < 1$$

$$3x+2 > -5$$

$$3x > -7$$

$$x > -\frac{7}{3}$$



$$x \in]-\frac{7}{3}, 1[$$

c) $(2x+3)^4 = 16 = 2^4$

$$2x+3 = \pm 2$$

$$2x+3 = 2$$

$$2x = 2-3 = -1$$

$$x = -\frac{1}{2}$$

$$2x+3 = -2$$

$$2x = -5$$

$$x = -\frac{5}{2}$$

$$x \in \left\{-\frac{1}{2}, -\frac{5}{2}\right\}$$

d) $7|x-2| + 7 = -2|x-2| + 25$

$$7|x-2| + 2|x-2| = 25-7$$

$$9|x-2| = 18$$

$$|x-2| = 2$$

$$x-2 = 2$$

$$x = 4$$

$$x-2 = -2$$

$$x = 0$$

$$x \in \{4, 0\}$$

III. $A = (2x-1) - |2x-1| + 4.$

a) $2x-1=0$

$x = \frac{1}{2}$

	x	$-\infty$	$\frac{1}{2}$	$+\infty$
$ 2x-1 $		$-2x+1$	$\bigcirc$	$2x-1$
A		$2x-1 - (-2x+1) + 4$		$2x-1 - (2x-1) + 4$
		$= 2x-1 + 2x-1 + 4$		$= 2x-1 - 2x+1 + 4$
		$= 4x+2$		$= 4$

$\nwarrow$
 4
 $\swarrow$

b) $x \in [\frac{1}{2}, +\infty[$

c) $B = \frac{x-1}{|x|-1}$

$|x|-1 \neq 0$

$|x| \neq 1$

$x \neq \pm 1$

$\Rightarrow D_B: x \in \mathbb{R} - \{1, -1\}$

or $]-\infty, -1[\cup]-1, 1[\cup]1, +\infty[$

IV. a) $\frac{a^{-4n}}{a^{\frac{2n}{3}}} \div \frac{a^{\frac{4n}{3}}}{a^{6n}} = \frac{a^{-4n}}{a^{\frac{2n}{3}}} \times \frac{a^{6n}}{a^{\frac{4n}{3}}} = \frac{a^{2n}}{a^{\frac{6n}{3}}} = \frac{a^{2n}}{a^{2n}} = 1.$

b) $^{15}\sqrt{\frac{(2^5)^{3n} + 2^{15n} \times 3^{15n}}{(3^3)^{5n} + (3^2)^{15n}}} = ^{15}\sqrt{\frac{2^{15n} + 2^{15n} \times 3^{15n}}{3^{15n} + 3^{30n}}}$

$= ^{15}\sqrt{\frac{2^{15n}(1+3^{15n})}{3^{15n}(1+3^{15n})}} = ^{15}\sqrt{\frac{2^{15n}}{3^{15n}}} = \frac{2^{\frac{15n}{15}}}{3^{\frac{15n}{15}}} = \frac{2^n}{3^n}.$

V.

a) $\vec{AB} + \vec{AD} = \vec{AC} = \vec{BJ}$

b) $\vec{FI} = \vec{GK} = \vec{DH}$

c) $\vec{GK} + \vec{KI} = \vec{FE}$

d) $\vec{FG} = \frac{1}{2} \vec{AI}$

e) $\vec{IA} + \vec{IC} = \vec{0}$

f) $\vec{AB} - \vec{BC} = \vec{AB} + \vec{CB}$
 $= \vec{AB} + \vec{DA} = \vec{DB}$